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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,254	07/03/2001	Jennifer Quirin Trelewicz	BLD920010008US1	1933
7590	02/07/2005		EXAMINER THOMPSON, JAMES A	
David W. Lynch Crawford Maunu PLLC 1270 Northland Drive, Suite 390 Mendota Heights, MN 55120			ART UNIT 2624	PAPER NUMBER

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/898,254

Applicant(s)

TRELEWICZ ET AL.

Examiner

James A Thompson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-9, 13-19 and 23 is/are rejected.
- 7) ☒ Claim(s) 4-6, 10-12 and 20-22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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DETAILED ACTION

Specification

1. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

The abstract of the disclosure is objected to because Applicant discusses the purported merits and speculative applications of the present invention. Correction is required. See MPEP § 608.01(b).

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Information Disclosure Statement

2. The information disclosure statement filed 12 December 2001 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because US Patent 5,196,451 is not a patent granted to Pellar and is not dated 01 April 1980. Examiner assumes Applicant is referring to US Patent 4,196,451 which is granted to Pellar and is dated 01 April 1980, and has considered said patent. However, said patent needs to be placed in an official Information Disclosure Statement. US Patent 5,196,451 has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7-9, 15-19 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Hall (US Patent 5,579,457).

Regarding claims 1, 7 and 23: Hall discloses a printing system (figure 6 of Hall) comprising a control unit (figure 6(60 (portion)) of Hall) for receiving a print file (figure 3a and column 4, lines 40-44 of Hall) and processing the print file for printing (figure 2 and column 4, lines 36-38 of Hall). In order to input into an array (figure 3a and column 4, lines 40-44 of Hall) image data that is to be printed (column 11, lines 22-25 of Hall) and process said image data (figure 2 and column 4, lines 36-38 of Hall), said image data must inherently be received as a print file.

Hall further discloses a print head (figure 6(62) of Hall) for conveying a print job according to the print file (column 8, lines 5-12 of Hall); and a device (figure 6(60(portion)) of Hall) for generating a spot for use in halftoning (figure 5b and column 7, lines 17-21 of Hall) wherein the halftoning reproduces an image defined by the print file using the print head (column 8, lines 5-12 of Hall), the device defines a spot function that combines two functions (DX/DY , $\sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX))$) (column 6, lines 8-15 of Hall) selected to provide a predetermined dot shape for use in a halftone cell (column 6, lines 16-21 of Hall). As is well-known in the programming arts, "atan2(DX,DY)" is equivalent to writing " $\arctan(DY/DX)$ ". The values of DY and DX, and thus the values of the function $\arctan(DY/DX)$, is determined by a function demonstrated in a pseudo-code loop (column 5, lines 39-46 of Hall). The atan2(DX,DY) is then combined with the overall function $\sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX))$ to define the spot function (column 5, lines 46-48 and column 6, lines 11-15 of Hall).

Hall further discloses that said spot function scales the spot function using a scaling function that varies according to a value of a first and second spot function ordinate (column 16, lines 16-21 of Hall). K_3 is used to scale the spot function by controlling the value of the function $\arctan(DY/DX)$, and thus also varies according to a value of the first and second spot function ordinates (column 16, lines 16-21 of Hall).

The control unit and the device correspond to the portions of the computer system (figure 6(60) of Hall), along with the corresponding memory and embodied computer software, that perform the functions of said control unit and said device.

Further regarding claim 1: The printing system of claim 7 performs the method of claim 1.

Further regarding claim 23: The means for receiving recited in claim 23 corresponds to the control unit of claim 7. The means for conveying recited in claim 23 corresponds to the print head of claim 7. The means for generating recited in claim 23 corresponds to the device of claim 7.

Regarding claim 17: Hall discloses an article of manufacture (figure 6 of Hall) comprising a program storage medium (figure 6(61) of Hall) readable by a computer (figure 6(60) of Hall), the medium tangibly embodying one or more programs of instructions executable by the computer to perform a method for halftoning an image (column 7, lines 32-34 and column 8, lines 1-4 of Hall). Said article of manufacture performs the method of claim 1, the arguments of which are incorporated herein.

Regarding claims 2, 8 and 18: The first function is an inverse trigonometric function ($\arctan(DY/DX)$) and the second function ($\sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX))$) is a trigonometric function

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based only in part on said first function. Further, the variables D, DX and DY are set based on distances and coordinates (column 5, lines 28-31 of Hall), and the variables K_1 , K_2 and K_3 are set based on desired spot function properties (column 6, lines 16-21 of Hall). DX and DY are partly dependent upon D since distances are based on relative coordinate value differences (column 5, lines 28-31 of Hall). Further, since $(\sin((\pi D/1.5) + \arctan(DY/DX)))$ can be rewritten as $(\sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX)))$, the values of K_1 , K_2 and K_3 , which determine the properties of the spot function (column 6, lines 16-21 of Hall), are dependent upon the values of D, DX and DY. Therefore, the two functions allow non-separable changes in spot shape.

Regarding claims 3, 9 and 19: Hall discloses a two-dimensional spot function described by $\sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX))$ where DX and DY are defined by the 2-dimensional coordinate system (column 5, lines 28-31 of Hall) and are therefore functions of the first and second spot function ordinate, which can be referred to as x and y. Therefore, $f(x, y) = \sin(K_1 + (K_2 D) + K_3 \arctan(DY/DX))$ since $\arctan(DY/DX)$ and D are both functions of x and y. An equivalent expression of the function $f(x, y)$ can be given using a Maclaurin series expansion, specifically:

$$f(x, y) = \sum_{j=0}^{\infty} \left\{ \frac{1}{j!} \left[\left(x' \frac{\partial}{\partial x'} + y' \frac{\partial}{\partial y'} \right)^j f(x', y') \right] \right\}$$

which can be expanded as:

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$$f(x, y) = f(x, y)_{\substack{x=0, \\ y=0}} + \left[\left(\frac{\partial f(x, y)}{\partial x} \right)_{\substack{x=0, \\ y=0}} x + \left(\frac{\partial f(x, y)}{\partial y} \right)_{\substack{x=0, \\ y=0}} y \right] + \\ \frac{1}{2!} \left[\left(\frac{\partial^2 f(x, y)}{\partial x^2} \right)_{\substack{x=0, \\ y=0}} x^2 + 2 \left(\frac{\partial^2 f(x, y)}{\partial x \partial y} \right)_{\substack{x=0, \\ y=0}} xy + \left(\frac{\partial^2 f(x, y)}{\partial y^2} \right)_{\substack{x=0, \\ y=0}} y^2 \right] + \dots$$

Since the Maclaurin series is a cumulative function, the spot function can therefore be expressed as:

$$f(x, y) = f_1(x, y) + f_2^{com}(x, y)$$

where:

$$f_1(x, y) = \frac{1}{2!} \left[\left(\frac{\partial^2 f(x, y)}{\partial x^2} \right)_{\substack{x=0, \\ y=0}} x^2 + 2 \left(\frac{\partial^2 f(x, y)}{\partial x \partial y} \right)_{\substack{x=0, \\ y=0}} xy + \left(\frac{\partial^2 f(x, y)}{\partial y^2} \right)_{\substack{x=0, \\ y=0}} y^2 \right] + \dots$$

and

$$f_2^{com}(x, y) = f(x, y)_{\substack{x=0, \\ y=0}} + \left[\left(\frac{\partial f(x, y)}{\partial x} \right)_{\substack{x=0, \\ y=0}} x + \left(\frac{\partial f(x, y)}{\partial y} \right)_{\substack{x=0, \\ y=0}} y \right].$$

The portion $f_2^{com}(x, y)$ can be rewritten as $f_2^{com}(x, y) = \frac{f_2(x, y)}{S(p, x, y)}$

since p is an ordinate scaling constant that is set and equations for $f_2(x, y)$ and $S(p, x, y)$ can be set such that the equation for $f_2^{com}(x, y)$ hold true. For example, if

$$f_2(x, y) = \frac{f(x, y)_{\substack{x=0, \\ y=0}} + \left[\left(\frac{\partial f(x, y)}{\partial x} \right)_{\substack{x=0, \\ y=0}} x + \left(\frac{\partial f(x, y)}{\partial y} \right)_{\substack{x=0, \\ y=0}} y \right]}{xy}$$

and

$$S(p, x, y) = xy$$

then

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$$f_2^{com}(x,y) = f(x,y) \Big|_{y=0} + \left[\left(\frac{\partial f(x,y)}{\partial x} \Big|_{x=0, y=0} \right) x + \left(\frac{\partial f(x,y)}{\partial y} \Big|_{x=0, y=0} \right) y \right] = \frac{f_2(x,y)}{S(p,x,y)}$$

and therefore:

$$f(x,y) = f_1(x,y) + \frac{f_2(x,y)}{S(p,x,y)}.$$

The equation for $f(x,y)$ can therefore be equivalently expressed in this format.

Written in this form, $S(p,x,y)$ is a scaling function of $f_2(x,y)$. Further, if S is a function of radius $r = \sqrt{x^2 + y^2}$, then it is inherent that S may be equivalently written as $S(p,r)$. Since the relation between x and y is established with the equation $r = \sqrt{x^2 + y^2}$, then the function $S(p,x,y)$ can be expressed using one less dimension based on the relation between x and y . Since said relation is $r = \sqrt{x^2 + y^2}$, then the function S may be expressed as $S(p,r)$.

Regarding claim 15: Hall discloses a print program of a computer (column 11, lines 1-4 of Hall) for generating a print file (column 8, lines 5-12 of Hall), wherein the device comprises screening software loaded into the computer, the computer executing the screening software to perform the halftoning (column 7, lines 32-34 and column 8, lines 1-4 of Hall).

Regarding claim 16: Hall discloses that the device comprises software loaded into the control unit (column 11, lines 1-4 of Hall), wherein the control unit executes the software to perform the halftoning (column 7, lines 32-34 and column 8, lines 1-4 of Hall).

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hall (US Patent 5,579,457) in view of Vaswani (US Patent 5,835,097).

Regarding claim 13: Hall does not disclose expressly that the device is a hardware card disposed between the control unit and the print head.

Vaswani discloses a hardware card for graphics processing (figure 3A(310) of Vaswani) disposed between a control unit (figure 3A(301-304) of Vaswani) and an image output device (figure 3A(305) of Vaswani) (column 6, lines 53-60 of Vaswani).

Hall and Vaswani are combinable because they are from similar problem solving areas, namely the construction of an electronic device that performs digital image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody said device taught by Hall as a hardware card disposed between a control unit and an image output device, as taught by Vaswani, said control unit being the control unit taught by Hall and said image output device being the print head taught by Hall. The motivation for doing so would have been that, as is well-known in the art, a separate hardware card for graphical processing decreases the

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computational burden on the main computer processor. Therefore, it would have been obvious to combine Vaswani with Hall to obtain the invention as specified in claim 13.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hall (US Patent 5,579,457) in view of Cunniff (US Patent 5,842,015).

Regarding claim 14: Hall does not disclose expressly that the device is a hardware card disposed within the control unit.

Cunniff discloses a graphics hardware card (figure 1(16) of Cunniff) disposed within a control unit (figure 1(18) of Cunniff) (column 5, lines 52-57 of Cunniff).

Hall and Cunniff are combinable because they are from similar problem solving areas, namely the construction of an electronic device that performs digital image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody said device taught by Hall as a hardware card disposed within the control unit. The motivation for doing so would have been that a separate hardware card for graphical processing decreases the computational burden on the main computer processor (column 1, lines 21-26 of Cunniff). Therefore, it would have been obvious to combine Cunniff with Hall to obtain the invention as specified in claim 14.

Allowable Subject Matter

8. Claims 4-6, 10-12 and 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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9. The following is a statement of reasons for the indication of allowable subject matter:

Claims 4, 10 and 20 recite a specific equation defining the spot function $f(x,y)$, which Examiner has been unable to find in the prior art.

Claims 5, 11 and 21 depend from claims 4, 10 and 20, respectively, and therefore also contain allowable subject matter. Further, Examiner has been unable to find the specifically defined scaling function $S(p,r)$, which is used as part of the specifically defined spot function recited in claims 4, 10 and 20, in the prior art.

Claims 6, 12 and 22 recite a specific equation for the angular orientation of the spot function, which Examiner has been unable to find in the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 703-305-6329. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
01 February 2005



THOMAS D
~~THOMAS~~ LEE
PRIMARY EXAMINER